

## CLAIMS

What is claimed is:

- 1 1. A computerized method for graph rewriting comprising:  
2 comparing an input graph representing a description scheme for multimedia  
3 content with a set of pre-defined template graphs; and  
4 validating the input graph when there is a match with a template graph.
- 1 2. The computerized method of claim 1, wherein the comparing uses a graph  
2 matching process.
- 1 3. The computerized method of claim 2, wherein the comparing comprises:  
2 creating adjacency matrices representing the input graph and the set of template  
3 graphs.
- 1 4. The computerized method of claim 1 further comprising:  
2 evaluating the input graph against a set of pre-defined alphabet graphs; and  
3 applying a rule associated with a matching alphabet graph to the input graph, the  
4 rule represented by a rule graph and a set of morphism graphs.
- 1 5. The computerized method of claim 4, wherein the evaluating uses a graph  
2 matching process.
- 1 6. The computerized method of claim 5, wherein the evaluating comprises:  
2 creating adjacency matrices for the input graph and the set of alphabet graphs.

1 7. The computerized method of claim 4, wherein the applying comprises:  
2 performing a pushout operation.

1 8. The computerized method of claim 4, wherein the applying comprises:  
2 performing a pullback operation.

1 9. The computerized method of claim 8, wherein performing the pullback operation  
2 comprises:  
3 creating adjacency matrices representing smallest portions of the set of morphism  
4 graphs that map the input and rule graphs to the alphabet graph using pre-images of parts  
5 of the alphabet graph marked for change; and  
6 multiplying the adjacency matrix associated with the input graph by a transpose of  
7 the adjacency matrix associated with the rule graph.

1 10. A computer-readable medium having executable instructions to cause a computer  
2 to perform a method comprising:  
3 comparing an input graph representing a description scheme for multimedia  
4 content with a set of pre-defined template graphs; and  
5 validating the input graph when there is a match with a template graph.

1 11. The computer-readable medium of claim 10, wherein the comparing uses a graph  
2 matching process.

1 12. The computer-readable medium of claim 11, wherein the comparing comprises:

2 creating adjacency matrices representing the input graph and the set of template  
3 graphs.

1 13. The computer-readable medium of claim 11, wherein the method further  
2 comprises:

3 evaluating the input graph against a set of pre-defined alphabet graphs; and

4 applying a rule associated with a matching alphabet graph to the input graph, the  
5 rule represented by a rule graph and a set of morphism graphs.

1 14. The computer-readable medium of claim 13, wherein the evaluating uses a graph  
2 matching process.

1 15. The computer-readable medium of claim 14, wherein the evaluating comprises:  
2 creating adjacency matrices for the input graph and the set of alphabet graphs.

1 16. The computer-readable medium of claim 13, wherein the applying comprises:  
2 performing a pushout operation.

1 17. The computer-readable medium of claim 13, wherein the applying comprises:  
2 performing a pullback operation.

1 18. The computer-readable medium of claim 17, wherein performing the pullback  
2 operation comprises:

3 creating adjacency matrices representing smallest portions of the set of morphism  
4 graphs that map the input and rule graphs to the alphabet graph using pre-images of parts  
5 of the alphabet graph marked for change; and  
6 multiplying the adjacency matrix associated with the input graph by a transpose of  
7 the adjacency matrix associated with the rule graph.

1 19. A system comprising:

2 a processor coupled to a memory through a bus; and  
3 a validation process executed by the processor from the memory to cause the  
4 processor to compare an input graph representing a description scheme for multimedia  
5 content with a set of pre-defined template graphs, and to validate the input graph when  
6 there is a match with a template graph.

1 20. The system of claim 19, wherein the validation process causes the processor to  
2 execute a graph matching process from the memory to compare the input graph and the  
3 template graphs.

1 21. The system of claim 20, wherein the validation process further causes the  
2 processor to create adjacency matrices for the input graph and the set of template graphs  
3 to compare the input graph and the template graphs.

1 22. The system of claim 19, further comprising a modification process executed by the  
2 processor from the memory to cause the processor to evaluate the input graph against a set  
3 of pre-defined alphabet graphs, and to apply a rule associated with a matching alphabet

4 graph to the input graph, wherein the rule is represented by a rule graph and a set of  
5 morphism graphs.

1 23. The system of claim 22, wherein the modification process further causes the  
2 processor to execute a graph matching process from the memory to evaluate the input  
3 graph.

1 24. The system of claim 23, wherein the modification process further causes the  
2 processor to create adjacency matrices for the input graph and the set of alphabet graphs  
3 to evaluate the input graph.

1 25. The system of claim 22, wherein the modification process further causes the  
2 processor to perform a pushout operation to apply the rule.

1 26. The system of claim 22, wherein the modification process further causes the  
2 processor to perform a pullback operation to apply the rule.

1 27. The system of claim 26, wherein the modification process further causes the  
2 processor to create adjacency matrices representing smallest portions of the set of  
3 morphism graphs that map the input and rule graphs to the alphabet graph using pre-  
4 images of parts of the alphabet graph marked for change, and to multiply the adjacency  
5 matrix associated with the input graph by a transpose of the adjacency matrix associated  
6 with the rule graph. to perform the pullback operation.